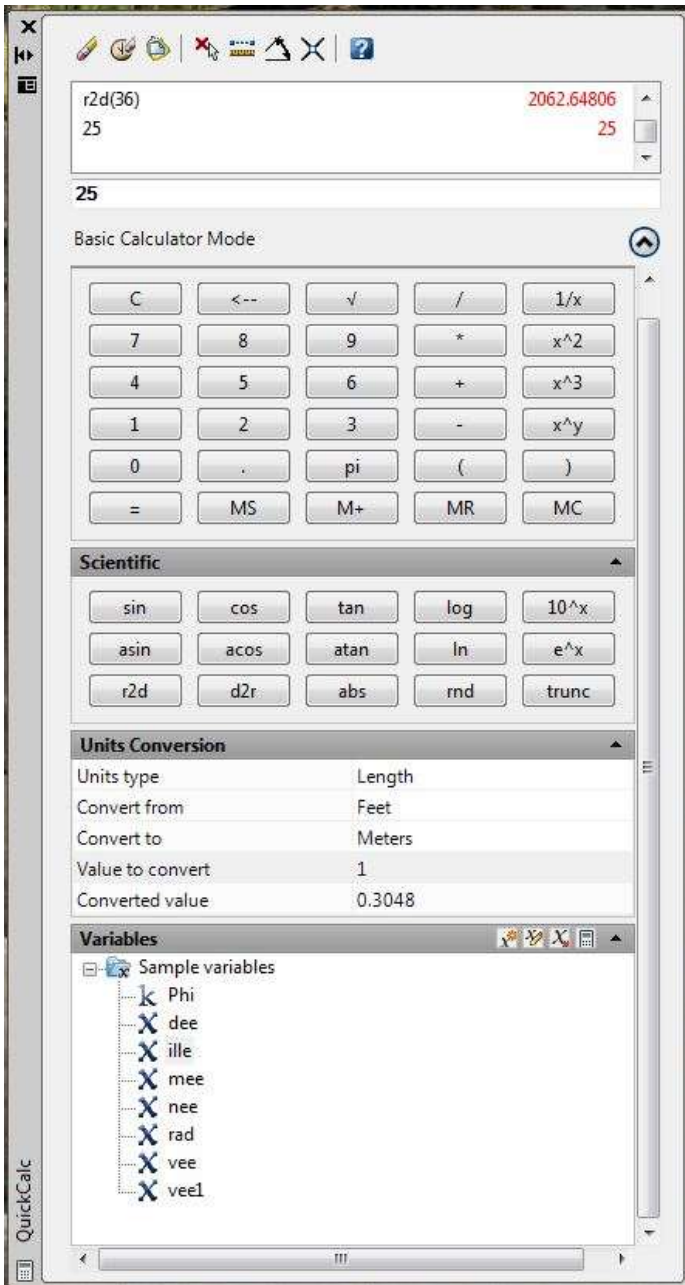


QUICKCALC (AUTOCAD CALCULATOR)

Did you know there was a built in calculator in AutoCAD? How cool is that for engineers and technicians to have. I can just hear you now..."I love Civil 3D more and more each day". However, you probably shouldn't throw your hand held calculators away...but this one is pretty neat. Most of the following was taken from the AutoCAD User's Guide from Autodesk.com.

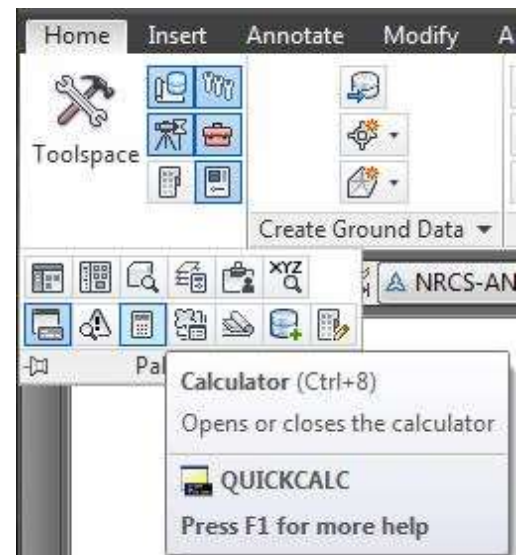


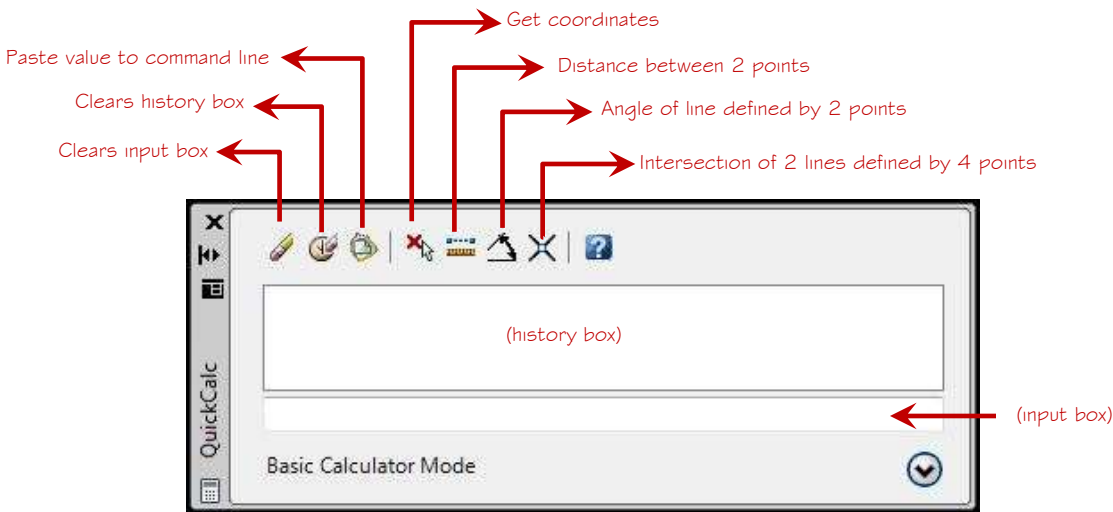
With QuickCalc, you can:

- Perform mathematical and trigonometric calculations
- Access and review previously entered calculations for re-evaluation
- Use the calculator with the Properties palette to modify object properties
- Convert units of measurement
- Perform geometric calculations related to specific objects
- Copy and paste values and expressions to and from the Properties palette and the Command prompt
- Perform computations on mixed numbers (fractions), and feet and inches
- Define, store, and use calculator variables
- Use geometric functions from the CAL command

You can access QuickCalc directly in the following ways:

- Home Tab ► Palettes ► Calculator
- At the Command prompt, enter QuickCalc or qc.
- In an active command, type 'qc' (this is called a transparent command)
- Ctrl+8





QuickCalc evaluates expressions according to the following standard mathematical rules of precedence:

- Expressions in parentheses first, starting with the innermost set
- Operators in standard order: exponents first, multiplication and division second, and addition and subtraction last
- Operators of equal precedence from left to right

The Input box of the calculator is where you enter and retrieve expressions. With QuickCalc, there are two ways you can enter data in the Input box. You can either enter expressions using the QuickCalc Number Pad buttons, or you can use the computer keyboard or numeric keypad. To use the computer numeric keypad, you must have NUMLOCK on. (KY's comment: Hello?...we use Civil 3D, we know that!)

To evaluate an expression, click the equal (=) sign on the QuickCalc Number Pad, or press Enter on the computer keyboard.

UNDERSTAND THE SYNTAX OF EXPRESSIONS

The syntax for QuickCalc expressions and Command prompt calculator expressions is identical. For example, to perform an operation on the vector or coordinates 5,2,0, you enter [5,2,0] in the Input box.

You can use the GETVAR function to read the value of a system variable. The syntax is

```
getvar(variable_name)
```

RULES FOR DISPLAYING AND HANDLING UNITS

QuickCalc adheres to the following rules:

- Results of calculations are always expressed in decimal format unless a distance is entered in feet and inches
- Angular values entered in the Input box are assumed to be degrees regardless of the settings in the Drawing Units dialog box. To specify radians, grads, and degrees, append an r, g, or d after the angle value.
- Results of angular calculations are always expressed in degrees with full AutoCAD precision.

When the drawing units are set to architectural units, the calculator displays the results of calculations of imperial units in the architectural format and rounds to the display precision (LUPREC) specified in the drawing. The results for all other calculations display in decimal format with full precision.

You can separate feet, inches, and fractional inches with a dash, a space, or nothing. You can use any of the following syntax cases to enter valid feet-inch formatted values:

- 5' or 60"
- 5'-9" or 5' 9" or 5'9"
- 5'-1/2" or 5' 1/2" or 5'1/2"
- 5'-9-1/2" or 5' 9-1/2" or 5'9-1/2"
- 5'-9 1/2" or 5' 9 1/2" or 5'9 1/2"

To designate inches for linear calculations, entering double quotes (") is optional. For example, instead of entering 5'9-1/2", you could enter 5'9-1/2.

WARNING: With imperial units, QuickCalc interprets a minus or a dash (-) as a unit separator rather than a subtraction operation. To specify subtraction, include at least one space before or after the minus sign. For example, to subtract 9" from 5', enter 5' -9" rather than 5'-9".

You can use QuickCalc to calculate square feet and cubic feet. To enter square or cubic feet, you must enter units using these abbreviations:

- sq. ft. or sq ft
- cu. ft. or cu ft

CONVERT DECIMAL UNITS INTO IMPERIAL UNITS

For distance measurements, enter an inches sign (") after the number in the results display. For example, if the computed distance is 15, enter " after the 15, press Enter or click = and the result displays in imperial units as 1'-3".

For computed results, enter the initial values in feet (') and inches (") to display the results in feet and inches. For example:

- $5 * 6 = 30$
- $5" * 6 = 2'-6"$
- $5" * 6" = 30 \text{ sq. in.}$
- $5" * 0'-6" = 0.208333333 \text{ sq. ft.}$

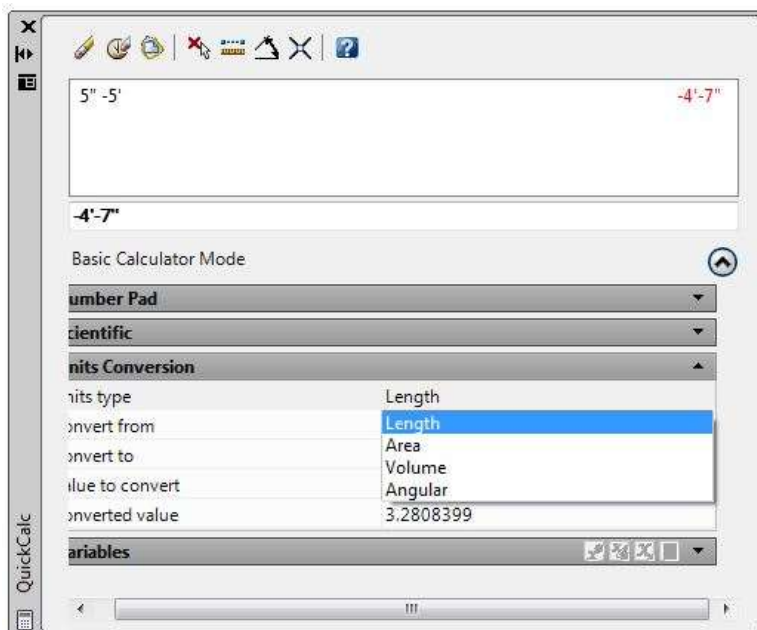
USE SHORTCUT FUNCTIONS

Several sample calculator variables have been predefined and stored in the Shortcut Functions category. These are geometric expressions that combine [CAL](#) functions with the Endpoint Snap mode. The following table describes the predefined variables that are available in the Variables area of the calculator.

Variable	Shortcut For	Description
dee	dist(end,end)	Distance between two endpoints
ille	ill(end,end,end)	Intersection of two lines defined by four endpoints
mee	(end+end)/2	Midpoint between two endpoints
nee	nor(end,end)	Unit vector in the XY plane and normal to two endpoints
rad	rad	Radius of a selected circle, arc, or polyline arc
vee	vee(end,end)	Vector from two endpoints
vee1	vec1(end,end)	Unit vector from two endpoints

You can easily modify these calculator variables or create your own. For more information, see the [CAL](#) command.

BASIC CALCULATOR AND UNITS CONVERSION

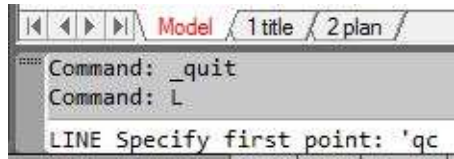


Here is the example of subtracting 5 feet from 5 inches...the result is a negative 4'-7".

The four areas that can have units converted are Length, Area, Volume and angular.

EXAMPLE 1:

You want to draw a line from the middle of a rectangle:



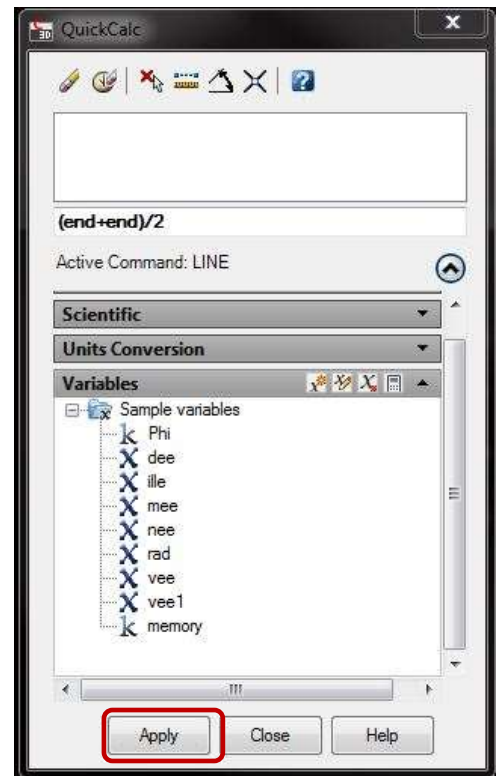
STEP 1

1. Start the LINE command and enter (do not select the first point)
2. At the prompt type 'qc (the 'qc is the transparent quickcalc command)

3. Make sure to have Variables list expanded on the calculator and double-click ille (this will place the variable in the input line on the calculator)
4. Press enter. You will return to your drawing with a large pickbox.

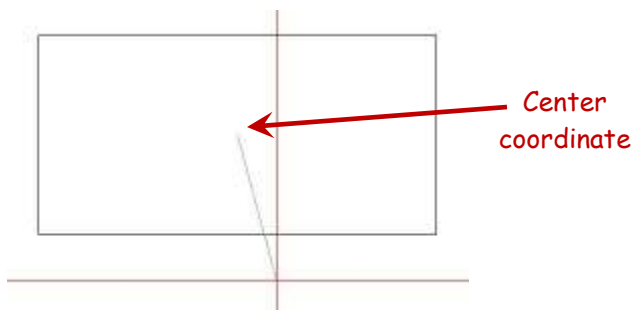


STEP 5

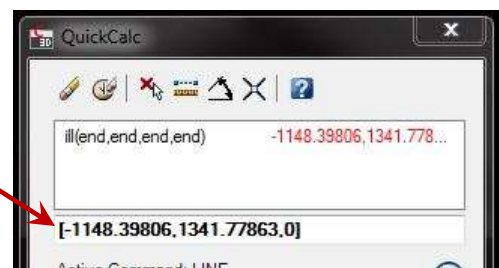


STEP 3 and 7

5. Pick the first set of diagonal points of the rectangle (like the upper right and lower left)
6. Pick the second set of diagonal points of the rectangle
7. Press the Apply button on the calculator
8. Your line should now be started at the center of the rectangle



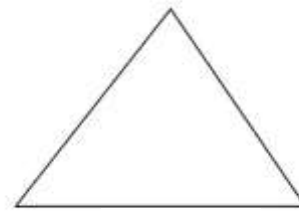
STEP 8



EXAMPLE 2:

You want to draw a line from the middle of a triangle:

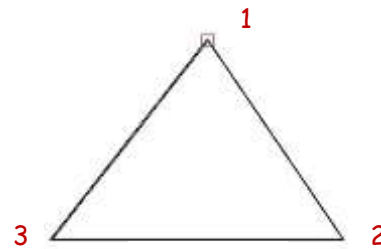
1. Draw a triangle.
2. Start the line command then type 'qc (to start the transparent Quickcalc command). This will open the calculator.
3. In the input box type the following variable $(\text{end}+\text{end}+\text{end})/3$ and then hit enter.



STEP 1

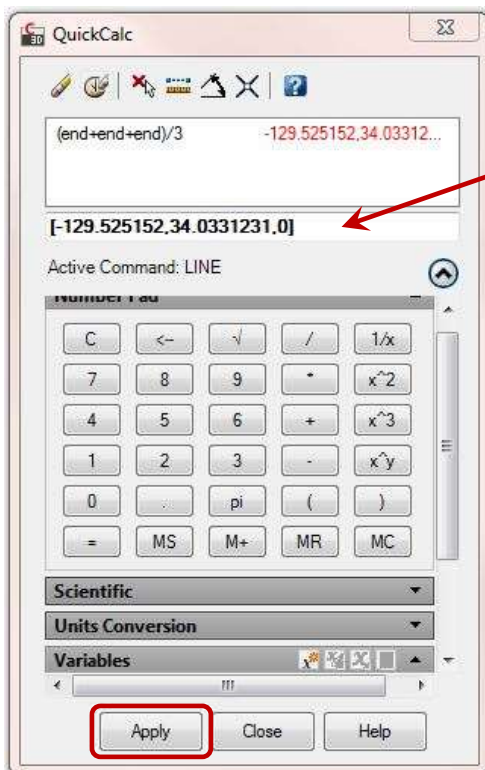


STEP 3



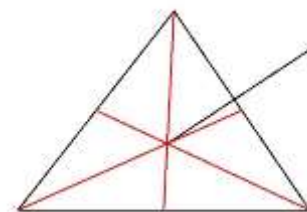
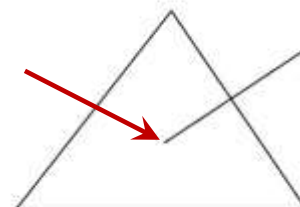
STEP 4

4. This will take you to the drawing where you can select the 3 endpoints of the triangle. When you have selected them, you will be taken back to the calculator where you will see the center coordinates of the triangle.
5. Then select Apply and the command will resume with your line endpoint starting at the middle of the triangle



STEP 4 and 5

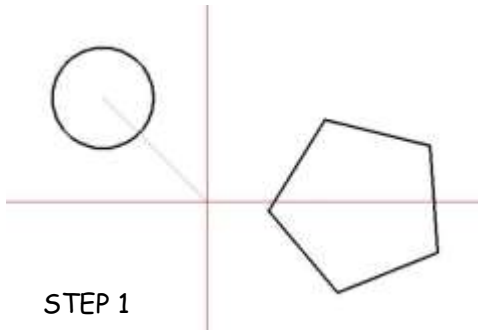
Center coordinate



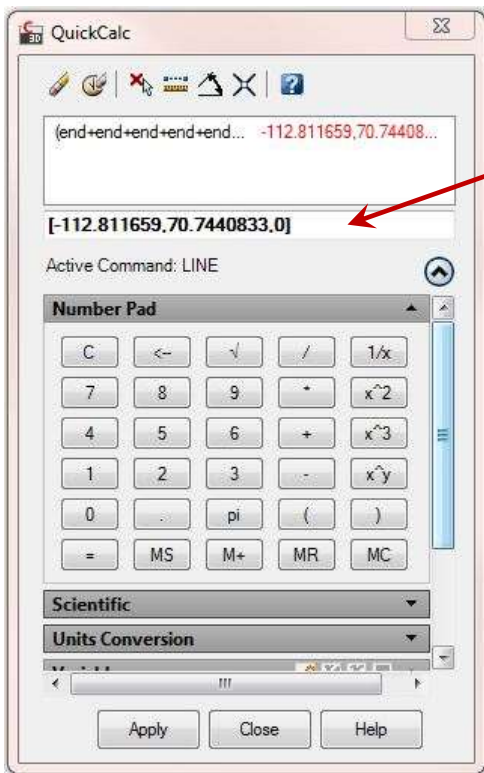
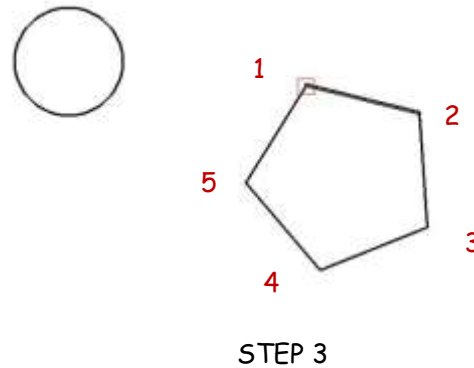
Let's check to see if it worked

EXAMPLE 3:

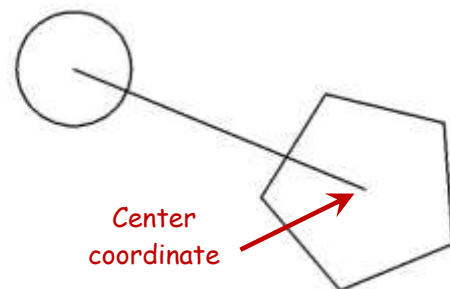
You want to draw a line from the center of a circle to the center of a pentagon:



1. Start the line command then type 'qc (to start the transparent Quickcalc command). This will open the calculator.
2. In the input box type the following variable $(\text{end}+\text{end}+\text{end}+\text{end}+\text{end})/5$ and then hit enter.



3. This will take you to the drawing where you can select the 3 endpoints of the triangle. When you have selected them, you will be taken back to the calculator where you will see the center coordinates of the triangle.
4. Then select Apply and the command will resume with your line endpoint starting at the middle of the triangle



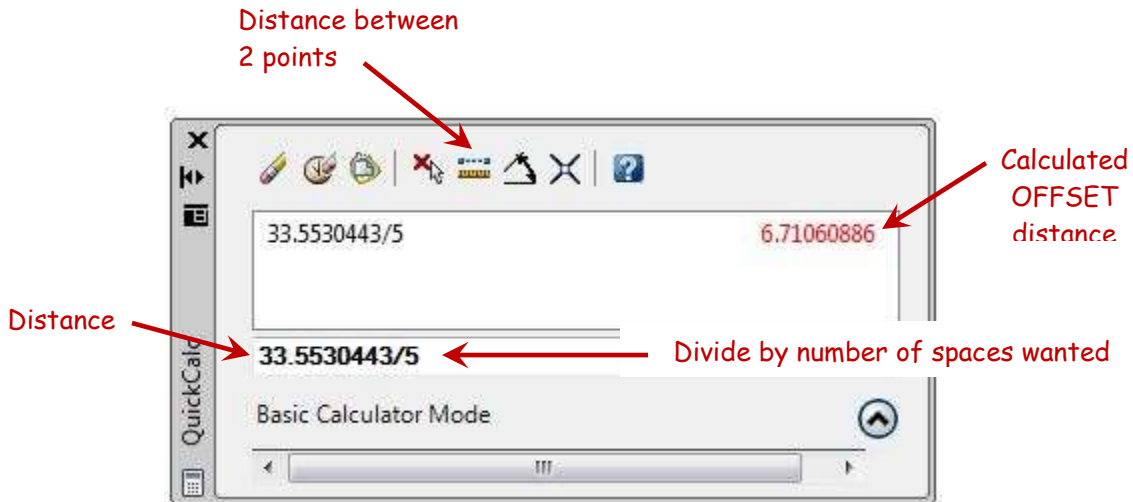
EXAMPLE 4:

You want to offset a line equally 5 times along an unknown distance:

1. Begin the OFFSET command.
2. Before selecting the object to offset, type 'qc on the command line to bring up the calculator.
3. Select the measure tool (distance between 2 points) and then select the end points of the line you want the equal lines from
4. When you have the distance divide by the number of spaces wanted

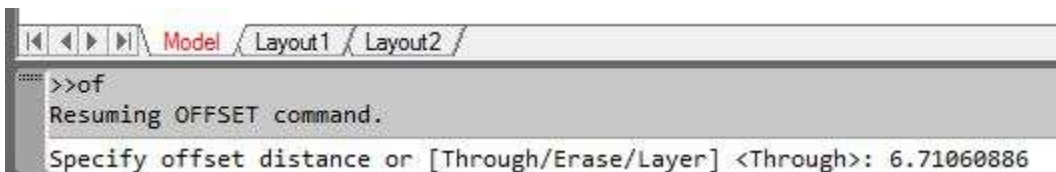


STEP 3

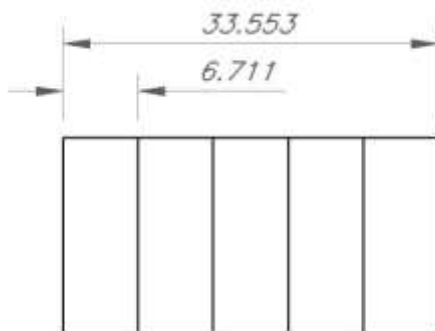


STEP 4

5. Select the enter key (this will put the calculated offset distance in the command line)



STEP 5



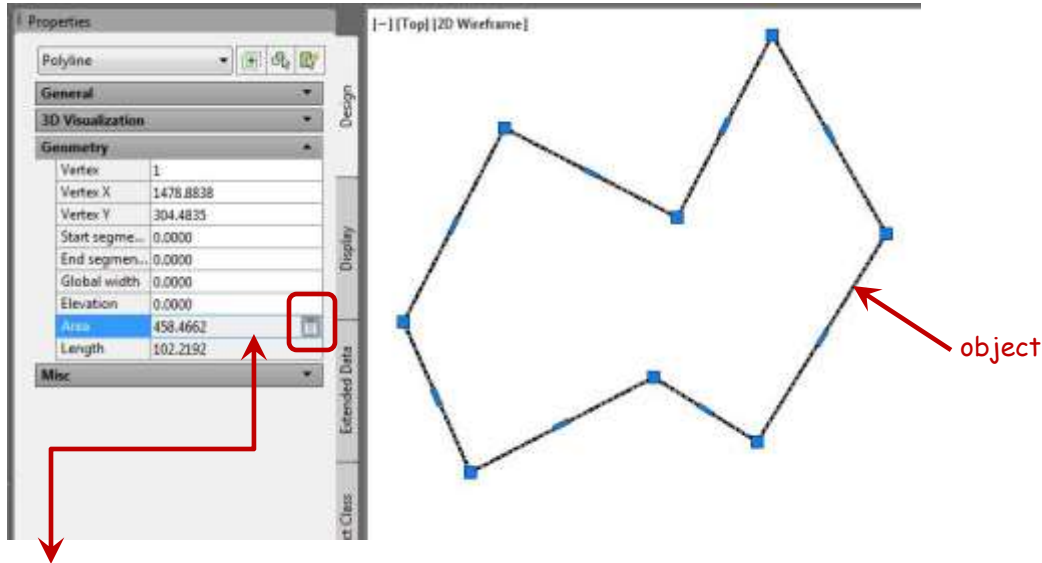
STEP 6

6. Continue the OFFSET command until finished

EXAMPLE 5:

Converting an area from square feet to square meters:

- Select the object that you want the area of.
- When it is highlighted, right click to view properties
- Under the *Geometry* section you will see area and when you click in that space you will see the calculator to the far right. Click on the calculator

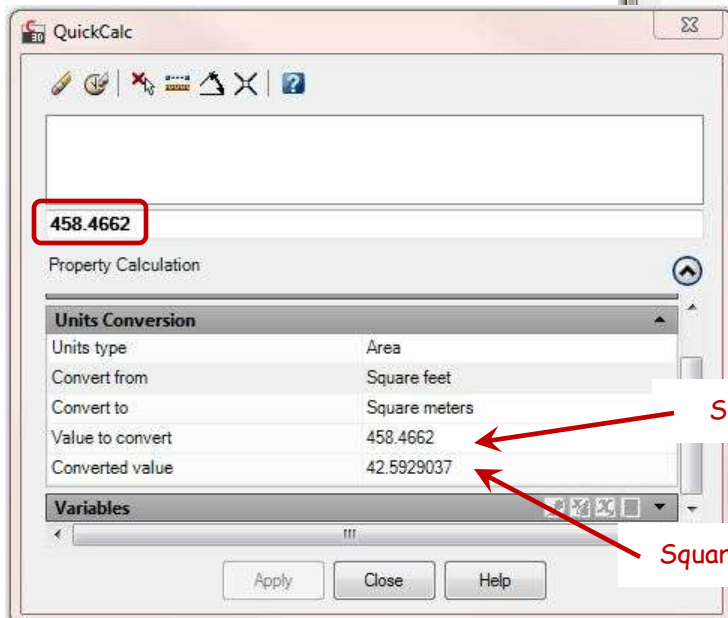
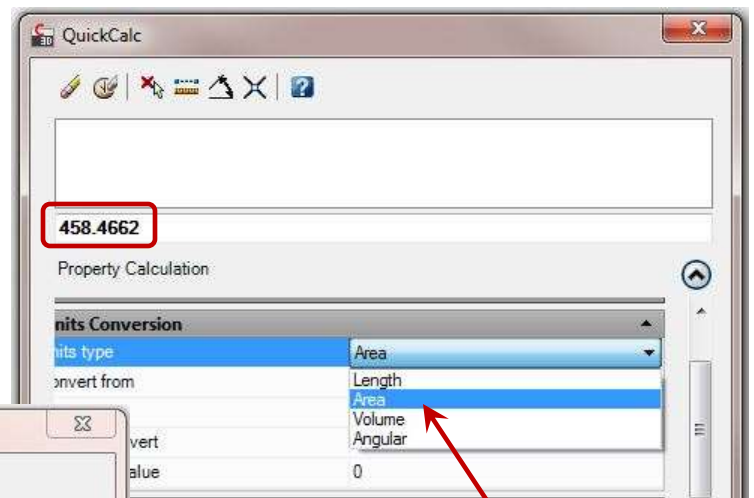


Note: the area from the Properties has filled the input box

- Select Area in the Units Type
- Select Units converting from
- Select Units converting to

The value should already be filled in, if it is not, just click in the input box to populate this field

You will instantly see your conversion on the last line



STEP 6

Square Feet

Square Meters